Overview of US work on AES001

C.M. Ginsburg (Fermilab)

AES01 to KEK meeting

December 4, 2007

JLab AES1 Results

R. Geng, AES Meeting at JLab, Aug 2007

- Serial AES cavity tests started April 16, 2007 at a rate of about 3 tests per month.
- 4 RF tests done, each time following 20 um EP.
- Quench field 17.5, 18.0, 17.0, 16.0 MV/m, no X-ray, insensitive to repeated EP processing.
- Pass-band mode measurements during test 1,2,4 consistently show cell #3 and #7 candidate quenching cells.
- May 30, 2007, first attempt for RF test with 8 thermometers attached to AES1 cell #3 and #7. Test failed due to cable breakdown and thermometers falling off.

All cavity processing done @JLab

Processing Recipe
J. Mammosser, TTC Meeting at Fermilab, April 2007

- Processing recipe
  - –Degrease
  - –Electropolishing (20 μm)
  - –Degrease
  - –First HPR+dry
  - –First cleanroom assembly
  - –Second HPR+dry
  - –Final cleanroom assembly
  - –Evacuation and leak check
  - –Low temperature (110 C) bake

Note: all cavities get 150 um bulk EP

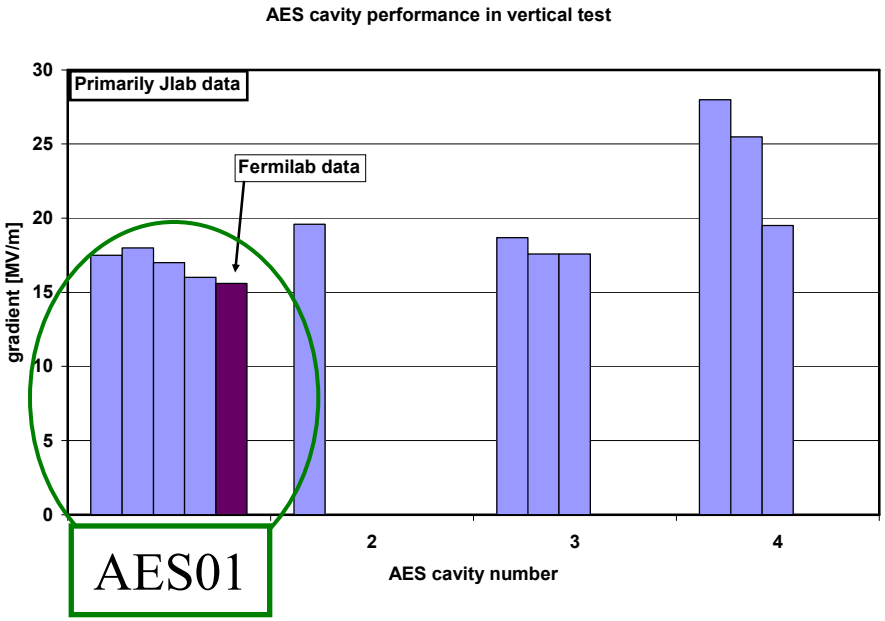
Material Removal (microns)
R. Geng, AES Meeting at JLab, Aug 2007

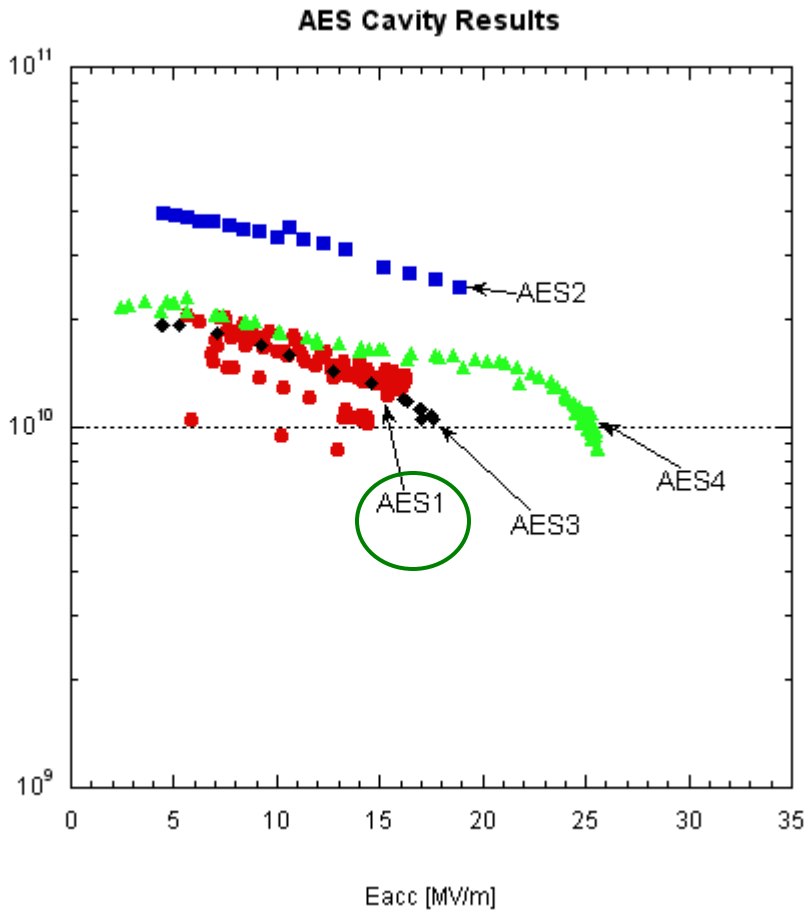
	1st test	2nd test	3rd test	4th test
A7	172	198	224	251
A6	187	213	239	265
AES1	213	236	252	269
AES2	164	190		
AES3	177	200		
AES4	221	257	277	

Note: updates to AES2,3,4 since August 2007 are not shown

JLab: all AES cavities together

R. Geng, AES Meeting at Jlab, Aug 2007





Note: updates to AES2,3,4 since August 2007 are not shown

Fermilab AES1 Activity

- (Was sent to PAC07 (T. Tajima) in June for show-and-tell. Maybe they opened it, but this was between JLab processes.)
- Arrived at Fermilab August 2007, pumped and fitted with couplers at JLab
  - Vacuum became compromised in between
    - Valve was open, so may be a human accident
  - Pumped and leak checked in Fermilab MP9 cleanroom and fitted with burst disk (cryogenic safety requirement)
  - No field emission observed in π mode, so not catastrophic vacuum loss
- Three thermal cycles and many vertical tests including mode measurements and thermometry (more on this…)
  - September 7-11, 2007(first 9-cell test on the new test stand!)
  - September 17-19, 2007
  - November 7-9, 2007
  - When referring to a cell #, we count from the opposite end to the input coupler port.

Fermilab AES1 Activity (cont.)

- November 11: end flanges were disassembled in a clean-ish environment, and ends covered
- Week of November 17: several efforts to view the inside with a borescope. Nothing of particular interest was seen in the region of the hotspot. Also warm RF test for fixed input coupler antenna. Some dust could enter, but probably not any grease.
- Cavity was in the open, with the ends usually covered during this time.
- December 4: Cavity shipped to KEK